

SCREENING SITE INSPECTION REPORT
FOR
BELVIDERE MUNICIPAL LANDFILL #2
BELVIDERE, ILLINOIS
U.S. EPA ID: ILD000605113
SS ID: NONE
TDD: F05-8902-021
PAN: FIL0584SA

MARCH 22, 1990

EPA Region 5 Records Ctr.



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1. INTRODUCTION

Ecology and Environment, Inc., Field Investigation Team (FIT) was tasked by the United States Environmental Protection Agency (U.S. EPA) to conduct a screening site inspection (SSI) of the Belvidere Municipal Landfill #2 (BML) site under contract number 68-01-7347.

The site was initially discovered by U.S. EPA through a Notification of Hazardous Waste Site form filed, pursuant to section 103(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, by Apache Foam Products of Belvidere, Illinois, on June 6, 1981. The site was evaluated in the form of a preliminary assessment (PA) that was submitted to U.S. EPA. The PA was prepared by Larry Winner of the Illinois Environmental Protection Agency (IEPA) on July 15, 1983 (IEPA 1983).

FIT prepared an SSI work plan for the BML site under technical directive document (TDD) F05-8706-015, issued on June 5, 1987. The SSI work plan was approved by U.S. EPA on February 24, 1989. The SSI of the BML site was conducted on March 21, 1989, under TDD F05-8902-021, issued on February 27, 1989.

The FIT SSI included an interview with site representatives, a reconnaissance inspection of the site, and the collection of seven soil samples, three residential well samples, and three monitoring well samples.

The purposes of an SSI have been stated by U.S. EPA in a directive outlining Pre-Remedial Program strategies. The directive states:

All sites will receive a screening SI to 1) collect additional data beyond the PA to enable a more refined preliminary HRS [Hazard Ranking System] score, 2) establish priorities among sites most likely to qualify for the NPL [National Priorities List], and 3) identify the most critical data requirements for the listing SI step. A screening SI will not have rigorous data quality objectives (DQOs). Based on the refined preliminary HRS score and other technical judgement factors, the site will then either be designated as NFRAP [no further remedial action planned], or carried forward as an NPL listing candidate. A listing SI will not automatically be done on these sites, however. First, they will go through a management evaluation to determine whether they can be addressed by another authority such as RCRA [Resource Conservation and Recovery Act].... Sites that are designated NFRAP or deferred to other statutes are not candidates for a listing SI.

The listing SI will address all the data requirements of the revised HRS using field screening and NPL level DQOs. It may also provide needed data in a format to support remedial investigation work plan development. Only sites that appear to score high enough for listing and that have not been deferred to another authority will receive a listing SI. (U.S. EPA 1988)

U.S. EPA Region V has also instructed FIT to identify sites during the SSI that may require removal action to remediate an immediate human health or environmental threat.

2. SITE BACKGROUND

2.1 INTRODUCTION

This section includes information obtained from SSI work plan preparation, the site representative interview, and a reconnaissance inspection of the site.

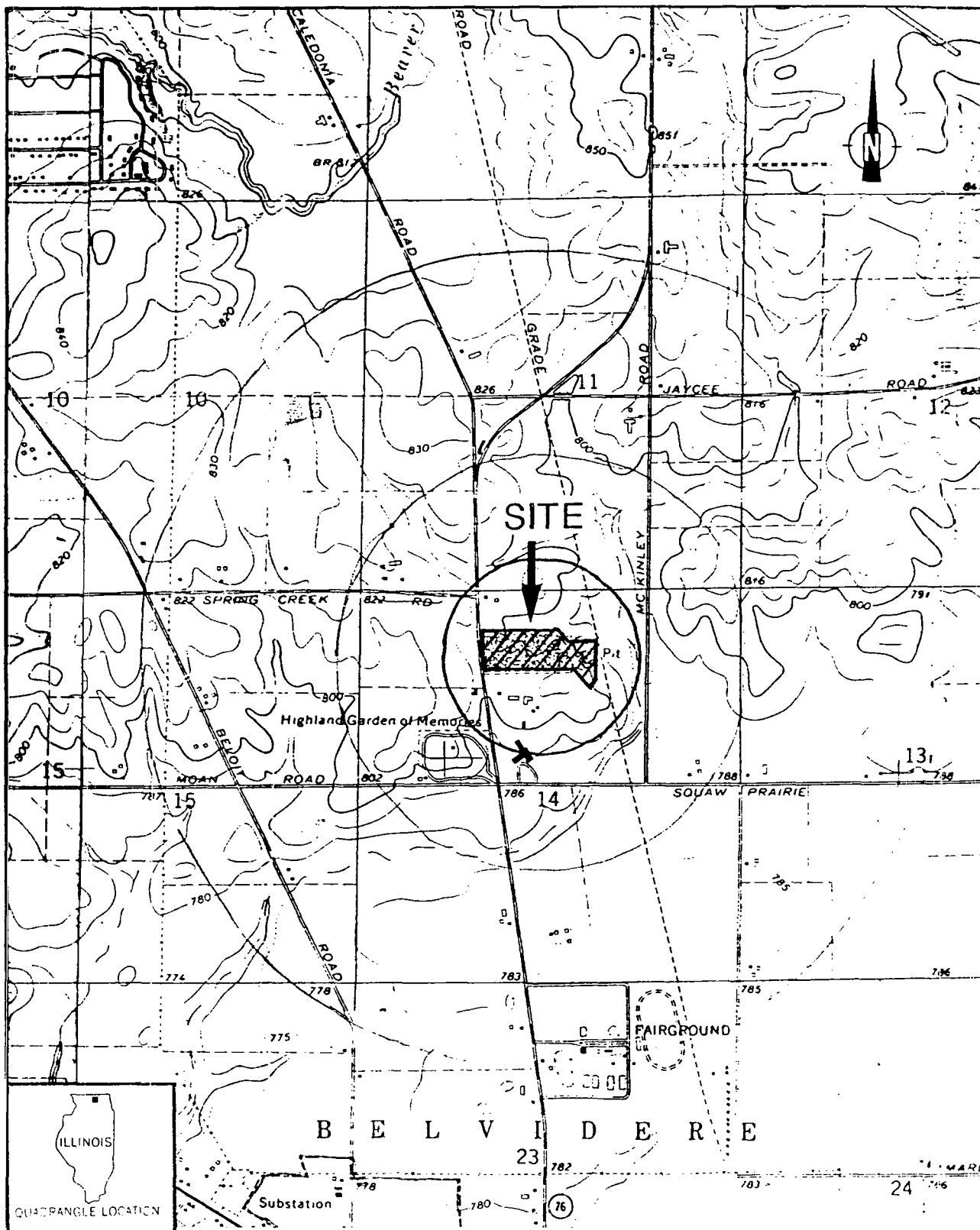
2.2 SITE DESCRIPTION

The BML site is an active landfill that currently accepts municipal refuse from the residents of Boone County, Illinois, and local manufacturers from the city of Belvidere, Illinois. The site is located on approximately 34 acres of land 2 miles north of Belvidere, in Boone County (S1/2NW1/4NE1/4 and S1/2NE1/4NW1/4 sec. 14, T.44N., R.3E.), east of Illinois Route 76 (see Figure 2-1). A 4-mile radius map of the BML site is provided in Appendix A.

2.3 SITE HISTORY

The BML property is currently owned jointly by the City of Belvidere and Boone County, and is operated by Milt Anderson, Inc., of Poplar Grove, Illinois. Prior to 1974, the county was the sole owner of the site, operating a county poor farm and nursing home on the property. The actual date of the county's acquisition of the property is unknown, but is estimated to have been between 1944 and 1954 (Klint et al. 1989).

Landfill operations at the BML site began in 1974, with a series of several companies operating the landfill prior to its operation by Milt Anderson, Inc. When the BML site was first opened, it accepted municipal and industrial waste from Boone County and some wastes from



SOURCE: Ecology and Environment, Inc. 1990; BASE MAPS: USGS, Caledonia, IL Quadrangle, 7.5 Minute Series, 1975; USGS, Cherry Valley, IL Quadrangle, 7.5 Minute Series, 1975; Belvidere North, IL Quadrangle, 7.5 Minute Series, 1975; Belvidere South, IL Quadrangle, 7.5 Minute Series, 1978.

SCALE

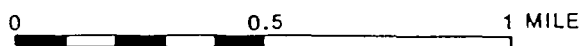


FIGURE 2-1 SITE LOCATION

other counties. Apache Foam Products disposed of amides, amines, imides, and resins at the BML site from 1974 to 1979 (U.S. EPA 1981). The BML site currently accepts wastes only from Boone County. Waste currently accepted at the site consists of approximately 80% municipal waste and 20% industrial waste. The specific industrial wastes currently accepted are city of Belvidere Sewage Treatment Plant sludge, foundry sand from Moline Corporation, and boiler cinders from Chrysler Corporation (Klint et al. 1989). The BML site does not currently accept waste from Apache Foam Products (U.S. EPA 1981).

The method of landfilling at the site consists of filling cells 20 feet wide by 8 to 12 feet high. In the past, the cells were also excavated to a depth of 20 feet before landfilling. IEPA later advised the city to remove only the topsoil before landfilling because of the proximity of the water table to the surface. Current practice at the landfill is the removal of topsoil only, with waste materials being deposited directly on the clay layer until the landfill's final elevation of approximately 856 feet above sea level has been reached (Eldredge Engineering Associates, Inc. [Eldredge Engineering] 1986).

After the refuse is hauled to a designated cell of the landfill, a minimum of 6 inches of cover material is applied at the end of each day, or a minimum of 12 inches of cover material is applied if no refuse is to be placed in that cell within 2 months. The cells are filled in a west-to-east direction (Eldredge Engineering 1986).

The landfill is constructed over natural till material and has no liner or leachate collection system between the refuse and the natural till material. An attempt to recover methane gas for energy was discontinued, because the landfill produced methane in quantities too small for the process to be cost efficient (Klint et al. 1989). A portion of the landfill is at its final elevation, but is not yet capped. Another area is capped with a final cover, which consists of a minimum of 2 feet of compacted clay with a minimum of 6 inches of topsoil covering it. The expected life of the landfill is 18 years; it is projected to be completely full in 1992 (Klint et al. 1989).

The BML site is open 6 days per week; Boone County residents bring waste to the site for disposal during its hours of operation. The annual volumes of waste accepted for 1987 and 1988 were approximately

31,500 cubic yards and 33,000 cubic yards, respectively (Klint et al. 1989).

According to site representatives, IEPA has cited the BML site for litter problems and for inadequate daily cover. In addition, on June 2, 1981, IEPA conducted an inspection of the BML site and discovered leachate seeps east of the landfill's active area. The site was also discovered to be in violation of supplemental permit no. 790811, which states that foundry sand will not be stockpiled before December 1 or after March 31 (IEPA 1981). According to a routine inspection report prepared by IEPA for the BML site on December 22, 1981, leachate seeps were still in evidence at the site (IEPA 1981a).

According to site representatives, no regulatory-related action is currently taking place at the BML site.

3. SCREENING SITE INSPECTION PROCEDURES AND FIELD OBSERVATIONS

3.1 INTRODUCTION

This section outlines procedures and observations of the SSI of the BML site. Individual subsections address the site representative interview, reconnaissance inspection, and sampling procedures. Rationales for specific FIT activities are also provided. The SSI was conducted in accordance with the U.S. EPA-approved work plan, with the following exceptions. Because of a lack of available wells in the area, three residential wells were sampled instead of the proposed four, and three monitoring wells were sampled instead of the proposed five. Two of the five monitoring wells proposed for sampling had been abandoned.

The U.S. EPA Potential Hazardous Waste Site Inspection Report (Form 2070-13) for the BML site is provided in Appendix B.

3.2 SITE REPRESENTATIVE INTERVIEW

William Perpich, FIT team leader, conducted an interview with Craig Lawler, city of Belvidere Director of Public Works; Fred Winterroth, Belvidere County Board Member; Ken Terrinoni, Belvidere Administrative Coordinator; Carol Klint, Boone County Health Administrator; and Pat Murphy, city of Belvidere Alderman. The interview took place at the Department of Public Works Building on March 20, 1989, at 1:30 p.m. Regina Bayer of FIT was also present during the interview. The interview was conducted to gather information that would aid FIT in conducting SSI activities.

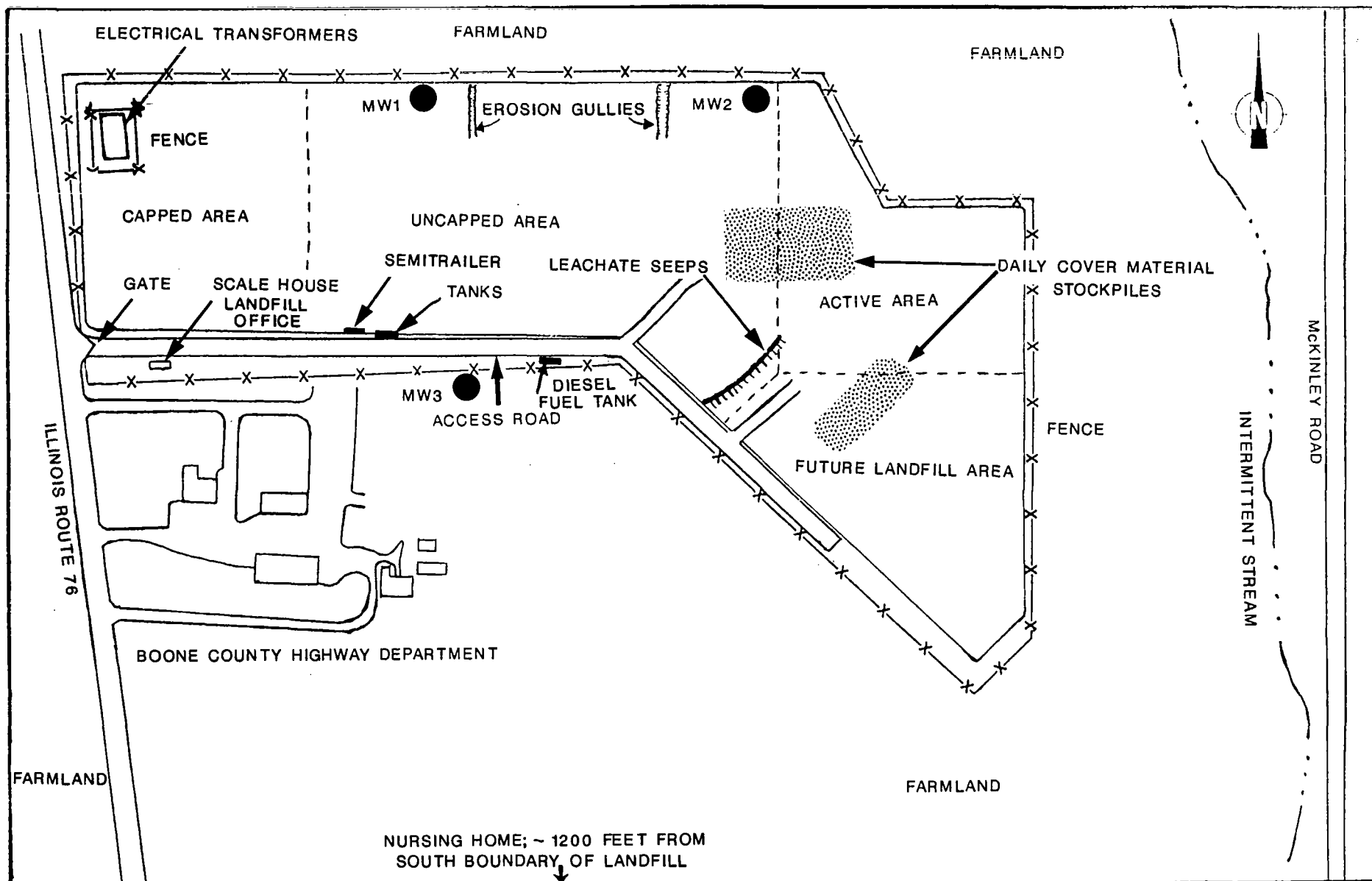
3.3 RECONNAISSANCE INSPECTION

Following the site representative interview, FIT conducted a reconnaissance inspection of the BML site and surrounding area in accordance with Ecology and Environment, Inc. (E & E), health and safety guidelines. The reconnaissance inspection included a walk-through of the site to determine appropriate health and safety requirements for conducting on-site activities and to make observations to aid in characterizing the site. FIT also determined exact sampling locations during the reconnaissance inspection.

The reconnaissance inspection began on March 21, 1989, at 9:00 a.m. Brent Anderson, Assistant to the Director of Public Works, arrived at the site before the reconnaissance inspection began, but did not accompany FIT during the walk-through.

Reconnaissance Inspection Observations. The BML site is located approximately 2 miles north of the city of Belvidere, Illinois. The roads in the area surrounding the BML site are Jaycee Road, running east-west approximately 3/4 miles north of the site; McKinley Road, running north-south approximately 800 feet east of the site; Squaw Prairie Road, running east-west approximately 1,700 feet south of the site; and Illinois Route 76, running north-south approximately 50 feet west of the site. An access road from Route 76 follows the southern boundary of the site, ending approximately 300 feet from the southeast corner of the landfill. South of the access road, adjacent to Route 76, are the Boone County Highway Department, located approximately 75 feet south of the site, and the Boone County Nursing Home, approximately 1,200 feet south of the site. Farm fields border the site on the north, east, and west. The terrain surrounding the site is relatively flat, with a gradual slope from north to south.

The landfill is approximately 2,000 feet long and 1,250 feet wide at its maximum width (see Figure 3-1 for locations of site features). The capped portion of the landfill is located on the west end of the site and extends 500 feet east. A second portion of the landfill is at its finished elevation but is uncapped. This area extends east 1,000 feet from the end of the capped area. The capped area was closed in 1988, and the uncapped area is expected to be completely closed in 1989 (Klint et al. 1989). The active fill area begins approximately 1,500



SOURCE: Ecology and Environment, Inc. 1990.

SCALE
0 100 200 300 FEET

FIGURE 3-1 SITE FEATURES

feet east of the landfill's western edge and extends 600 feet south of the northern edge of the landfill. The area designated for future land-filling extends from 600 feet south to 1,250 feet south of the northern boundary and from 1,400 feet to 2,000 feet east of the western boundary of the landfill. The topography of the completed portion of the landfill slopes 20% to its final elevation along the perimeter face and has a 2% slope on its top surface (Eldredge Engineering 1986). The natural topography of the future landfill area has an approximate slope of 2.5% from west to east (USGS 1975).

A sign is posted at the entrance to the site stating the hours the landfill is open (Monday through Friday 8:00 a.m. to 3:30 p.m.; Saturday 8:00 a.m. to noon). The site is entirely fenced and has a locked gate across the access road.

A landfill office/scale house is located between the access road and the southern site border, approximately 100 feet east of the Route 76 entrance. An abandoned semitrailer, used for storage, and a discarded underground storage tank were observed just north of the access road along the southern edge of the landfill. A discarded diesel fuel storage tank is located south of the access road. The landfill office/scale house is located on the access road, approximately 300 feet east of Route 76. An inactive electrical step-up transformer, part of the discontinued methane collection system (Klint et al. 1989), is located in the northwest corner of the landfill. The transformer stands on a concrete slab, surrounded by a fence.

Along the north slope of the capped area of the landfill, several erosion gullies were observed, although no refuse was exposed. On the eastern half of the north slope FIT observed stained soil at the bottom of some erosion gullies. Approximately 765 feet east of the western boundary of the landfill, near the northern boundary of the landfill, FIT detected methane readings above background in the breathing zone, using an OVA 128 equipped with a charcoal filter. These readings were recorded in the vicinity of the abandoned methane collection pipes.

Two stockpiles of daily cover material were observed in the active area of the landfill. The first was located in the west-central portion of the active landfill area and the second was located at the north end

of the future landfill area. A line of leachate seeps was observed in the southeast corner of the uncapped area.

East of the landfill FIT observed an intermittent stream. According to a United States Geological Survey (USGS) topographic map, the stream flows south to the Kishwaukee River (USGS 1978). No water was observed in the stream at the time of the SSI.

Scattered litter was observed throughout the farm fields adjoining the BML site. Photographs of the BML site are provided in Appendix C.

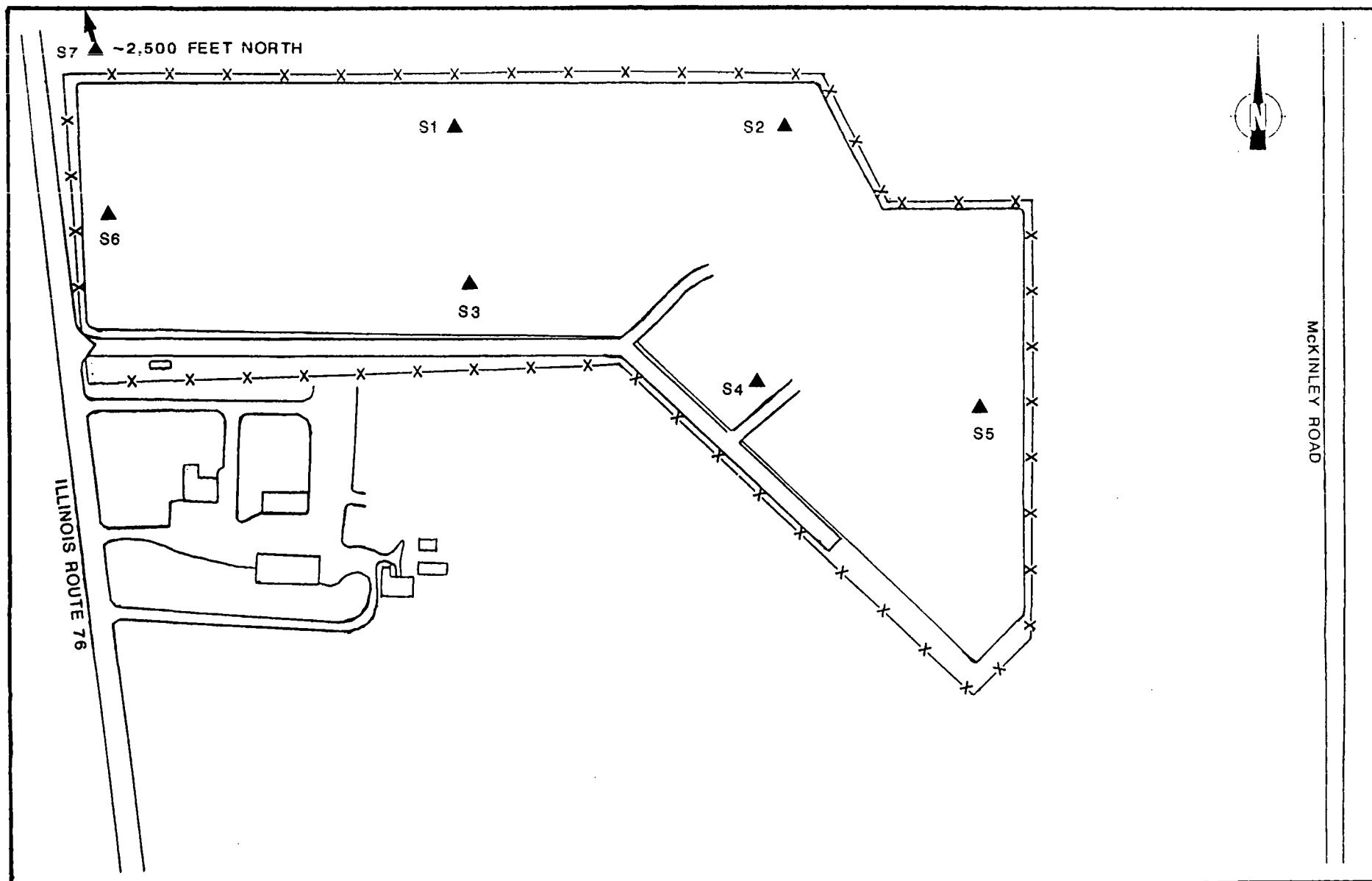
3.4 SAMPLING PROCEDURES

Samples were collected by FIT at locations selected during the reconnaissance inspection to determine whether U.S. EPA Target Compound List (TCL) compounds and U.S. EPA Target Analyte List (TAL) analytes were present at the site. The TCL and TAL, with corresponding quantitation/detection limits, are provided in Appendix D.

On March 21, 1989, FIT collected six surface soil samples, one potential background soil sample, and two monitoring well samples, MW2 and MW3. On March 22, 1989, FIT collected three residential well samples and one monitoring well sample, MW1. Portions of the soil samples were offered to the site representatives, but they were declined.

Soil Sampling Procedures. Soil sample S1 was collected approximately 800 feet east of the western boundary of the site, below an erosion gully (see Figure 3-2 for soil sampling locations). Soil sample S2 was collected near the northeast corner of the uncapped area of the landfill. Soil sample S3 was collected along the south slope of the landfill, approximately 700 feet east of the site's western boundary. Soil sample S4 was collected in the area of the leachate seeps, southwest of the active fill area. Soil sample S5 was collected along the east-facing slope of the active fill area. Soil sample S6 was collected along the west-facing slope of the capped area of the landfill. Sampling locations for samples S1 through S6 were chosen to determine whether TCL compounds and/or TAL analytes are present at the BML site.

Soil samples were collected using a hand trowel and placed in a stainless steel bowl. Each sample was then transferred with a trowel to



SOURCE: Ecology and Environment, Inc. 1990.

SCALE
0 (FEET) 300

FIGURE 3-2 SOIL SAMPLING LOCATIONS

sample bottles. The portions of the samples to be analyzed for volatile organics were collected first (E & E 1987).

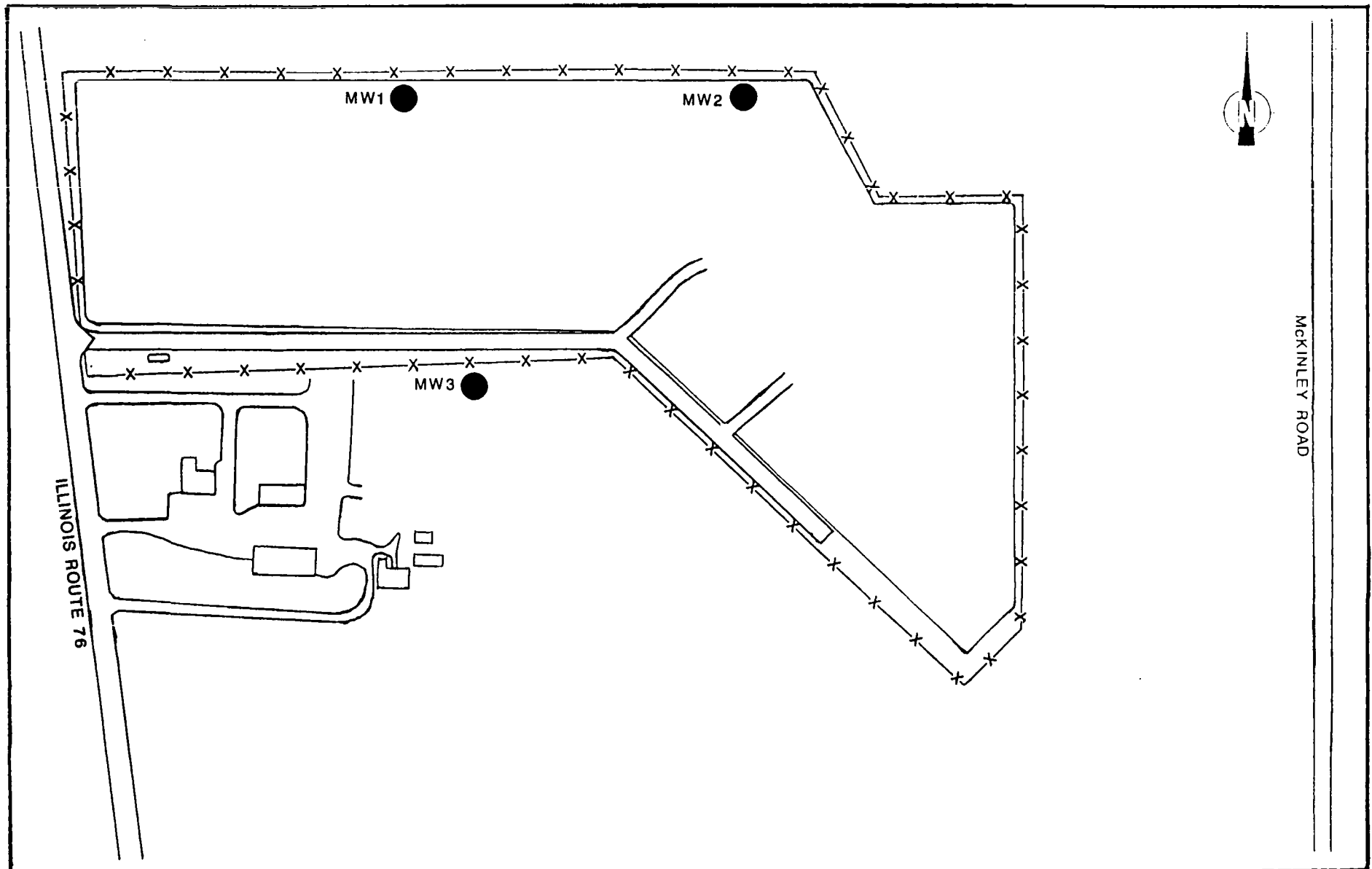
A potential background sample (indicated as S7) was collected near the boundary of a farm field north of the site, at the southeast corner of the intersection between Route 76 and Woodstock Road. The potential background soil sample was collected to determine the representative chemical content of the soil in the area surrounding the site. The location was chosen because the ground surface appeared to be in an undisturbed state.

Standard E & E decontamination procedures were adhered to during the collection of all soil samples. The procedures included the scrubbing of all equipment (e.g., trowels, bowls, and spoons) with a solution of Alconox detergent and distilled water, and triple-rinsing the equipment with distilled water before the collection of each sample (E & E 1987). All soil samples were packaged and shipped in accordance with U.S. EPA-required procedures.

As directed by U.S. EPA, all soil samples were analyzed under the U.S. EPA Contract Laboratory Program (CLP) for TCL compounds by PEI Associates, Inc., of Cincinnati, Ohio, and for TAL analytes by Keystone Environmental Resources of Houston, Texas.

Monitoring Well Sampling Procedures. Three monitoring well samples (indicated as MW1, MW2, and MW3) were collected to determine whether TCL compounds and/or TAL analytes had migrated from the site into groundwater. Sample MW1 was collected at a well labeled G103 by the City of Belvidere. The well was Non-responsive of the landfill (see Figure 3-3 for monitoring well sampling locations). Sample MW2 was collected at a well (labeled G102 by the City of Belvidere) Non-responsive. Sample MW3 was collected at a well (labeled G110 by the City of Belvidere) Non-responsive.

While venting MW2, FIT detected elevated readings of methane with the OVA 128. FIT also observed that MW3 did not have a cap fitting onto the polyvinyl chloride (PVC) casing of the well and that the cover over the well was not locked. FIT noticed an odor at MW3 upon venting the well, although no readings were detected with the OVA 128.



SOURCE: Ecology and Environment, Inc. 1990.

SCALE
0 (FEET) 300

FIGURE 3-3 MONITORING WELL SAMPLE LOCATIONS

Five times the standing volume of water was purged from MW2 and MW3 before sampling. MW1 was purged dry before five times the standing volume of water could be removed. There was very little recharge in MW1, so the well was sampled on the following day. At this time, sufficient water was present for the collection of the volatile organic and analyte portions of the sample only. Table 3-1 lists well elevation, depth, and water level for each monitoring well sampled.

All wells were purged and sampled with stainless steel bailers attached to dedicated nylon rope. The bailers used were washed with Alconox detergent and distilled water, and triple-rinsed with distilled water (E & E 1987). A duplicate monitoring well sample was collected at MW3, and a field blank was also collected for each day that monitoring well samples were collected (blank 1 and blank 2). All samples were collected in accordance with U.S. EPA quality assurance/quality control (QA/QC) requirements. All monitoring well samples were packaged and shipped in accordance with U.S. EPA-required procedures.

As directed by U.S. EPA, all monitoring well samples were analyzed under the U.S. EPA CLP for TCL compounds by PEI Associates, Inc., of Cincinnati, Ohio, and for TAL analytes by Keystone Environmental Resources of Houston, Texas.

Residential Well Sampling Procedures. Residential well samples (indicated as RW1, RW2, and RW3) were collected to determine whether TCL compounds and/or TAL analytes had migrated from the site to groundwater in the vicinity of the site.

The residential well sampling locations were chosen because of their proximity to the site and their availability for sampling (see Figure 3-4 for residential well sampling locations). Sample RW1 was collected from a well with a depth of 500 feet, on the grounds of the Boone County Nursing Home, **Non-responsive**. Sample RW2 was collected at a residence on McKinley Road, approximately **Non-responsive**. The depth of this well is unknown. Sample RW3 was collected at a residence on Squaw Prairie Road, **Non-responsive**, from a well with a depth of approximately 50 feet. A duplicate residential well sample was also collected in accordance with U.S. EPA QA/QC requirements. The

Table 3-1

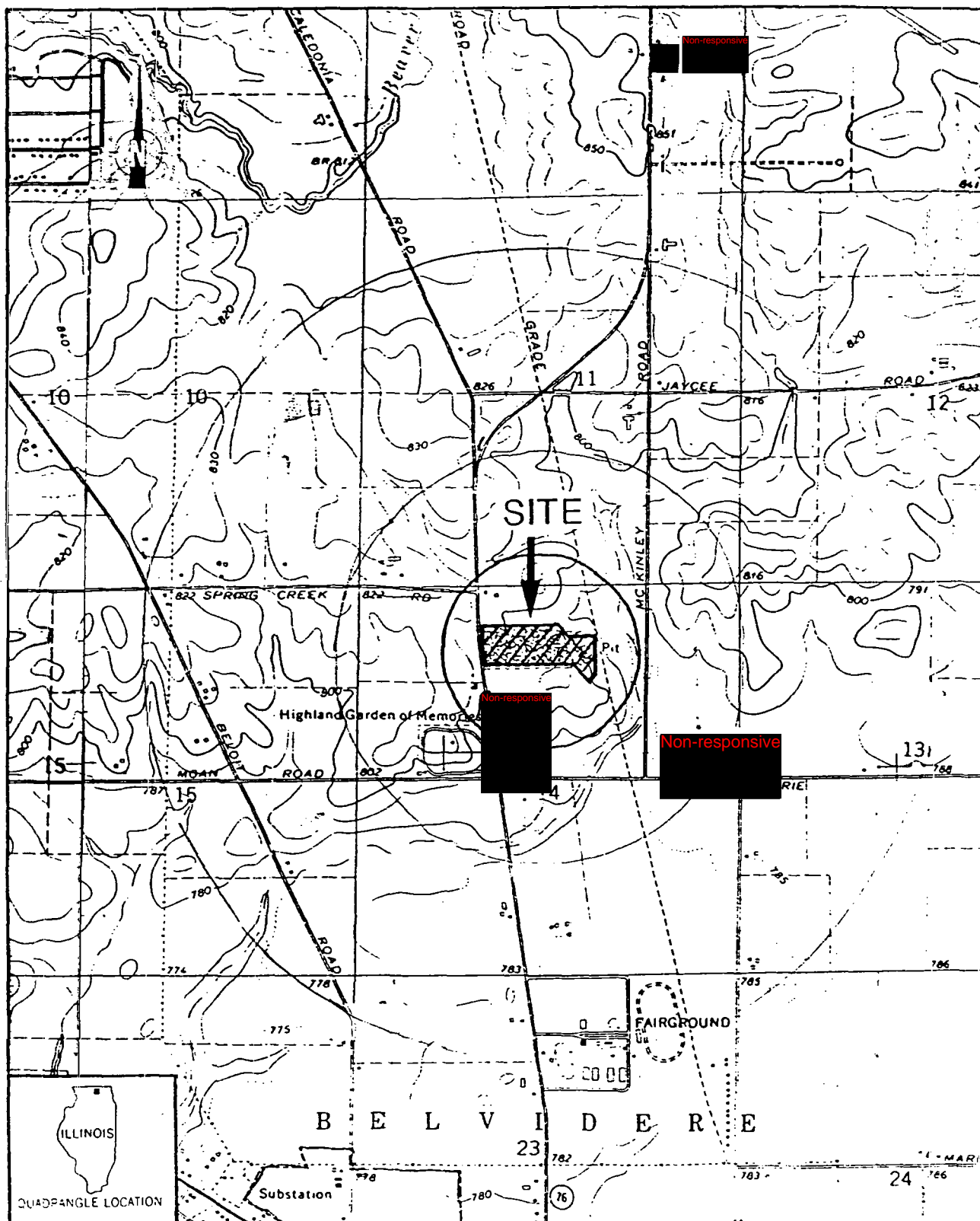
ELEVATION, WELL DEPTH, AND WATER LEVEL OF MONITORING WELLS

Well Sampled	Elevation * (feet)	Well Depth (feet from top of casing)	Water Level (feet from top of casing)
MW1	769.00	39.20	26.70
MW2	765.69	31.00	23.31
MW3	768.15	53.00	39.85

Well depth and water level were determined by FIT during the site inspection.

* Approximate well elevations are derived from a boring location diagram (Layne-Western Company, Inc. no date).

Source: Ecology and Environment, Inc. 1990.



SOURCE: Ecology and Environment, Inc. 1990; BASE MAPS: USGS, Caledonia, IL Quadrangle, 7.5 Minute Series, 1975; USGS, Cherry Valley, IL Quadrangle, 7.5 Minute Series, 1975; Belvidere North, IL Quadrangle, 7.5 Minute Series, 1975; Belvidere South, IL Quadrangle, 7.5 Minute Series, 1978.

0 0.5 1 MILE

FIGURE 3-4 RESIDENTIAL WELL SAMPLING LOCATIONS

duplicate sample was collected at RW1 (see Table 3-2 for addresses of residential well sampling locations).

All residential well samples were obtained from outlets that bypassed water treatment systems and/or storage tanks. The water was allowed to discharge from the outlets for 15 minutes before samples were collected to insure that the sample sources had been purged of standing water (E & E 1987). All residential well samples were packaged and shipped in accordance with U.S. EPA-required procedures.

As directed by U.S. EPA, all residential well samples were analyzed under the U.S. EPA CLP for TCL compounds by CompuChem Laboratories of Research Triangle Park, North Carolina, and for TAL analytes by Versar, Inc., of Springfield, Virginia.

ADDRESSES OF RESIDENTIAL WELL SAMPLING LOCATIONS

Source: Ecology and Environment, Inc. 1990.

4. ANALYTICAL RESULTS

4.1 INTRODUCTION

This section includes results of chemical analysis of FIT-collected soil samples and monitoring and residential well samples for TCL compounds and TAL analytes.

4.2 RESULTS OF CHEMICAL ANALYSIS OF FIT-COLLECTED SAMPLES

Soil Samples. Chemical analysis of FIT-collected soil samples revealed substances from the following groups of TCL compounds and TAL analytes: halogenated hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), aromatics, ketones, sulphur hydrocarbons, common laboratory artifacts (methylene chloride and di-n-butylphthalate), heavy metals, and common soil constituents (see Table 4-1 for complete soil sample chemical analysis results).

Monitoring Well Samples. Chemical analysis of FIT-collected monitoring well samples revealed substances from the following groups of TCL compounds and TAL analytes: halogenated hydrocarbons, aromatics, sulphur hydrocarbons, common laboratory artifacts (methylene chloride and acetone), heavy metals, and common soil constituents (see Table 4-2 for complete monitoring well sample chemical analysis results).

Residential Well Samples. Chemical analysis of FIT-collected residential well samples revealed substances from the following groups of TCL compounds and TAL analytes: PAHs, heavy metals, and common soil constituents (see Table 4-3 for complete residential well sample chemical analysis results).

U.S. EPA CLP quantitation/detection limits used in the analysis of FIT-collected soil, monitoring well, and residential well samples are provided in Appendix D.

Table 4-1
RESULTS OF CHEMICAL ANALYSIS OF
FIT-COLLECTED SOIL SAMPLES

Sample Collection Information and Parameters	Sample Number						
	S1	S2	S3	S4	S5	S6	S7
Date	3/21/89	3/21/89	3/21/89	3/21/89	3/21/89	3/21/89	3/21/89
Time	1155	1215	1440	1500	1530	1615	1640
CLP Organic Traffic Report Number	EW171	EW172	EW173	EW174	EW175	EW176	EW177
CLP Inorganic Traffic Report Number	MEW982	MEW983	MEW984	MEW985	MEW986	MEW987	MEW988
<u>Compound Detected</u>							
(values in $\mu\text{g/kg}$)							
<u>Volatile Organics</u>							
chloroethane	--	--	--	31	--	--	--
methylene chloride	76B	--	--	210B	--	--	--
acetone	--	--	--	7,800JD	--	--	--
carbon disulfide	--	--	--	8	--	--	--
1,1-dichloroethane	--	--	--	250	--	--	--
2-butanone (MEK)	--	--	--	4,200JD	--	--	--
1,1,1-trichloroethane	--	--	--	260JD	--	--	--
carbon tetrachloride	--	--	--	29	--	--	--
benzene	--	--	--	4J	--	--	--
2-hexanone	--	--	--	490JD	--	--	--
tetrachloroethene	--	13B	--	--	--	--	--
toluene	--	--	--	220	--	--	--
ethylbenzene	--	--	--	46	--	--	--
styrene	--	--	--	15	--	--	--
xylene (total)	--	--	--	85	--	--	--
<u>Semivolatile Organics</u>							
fluorene	--	92J	--	--	--	--	--
phenanthrene	--	760J	290J	--	72J	--	--
anthracene	--	170J	--	--	--	--	--
di-n-butylphthalate	120J	110J	--	--	110J	90J	--

Table 4-1 (Cont.)

Sample Collection Information and Parameters	Sample Number						
	S1	S2	S3	S4	S5	S6	S7
<u>Semivolatile Organics</u>							
fluoranthene	55J	1,100	500J	--	--	--	--
pyrene	--	--	400JB	--	--	--	--
benzo[a]anthracene	--	430J	200J	--	--	--	--
chrysene	--	530J	250J	--	--	--	--
benzo[b]fluoranthene	--	360J	--	--	--	--	--
benzo[k]fluoranthene	--	400J	--	--	--	--	--
benzo[a]pyrene	--	450J	150J	--	--	--	--
indeno[1,2,3-cd]pyrene	--	240J	--	--	--	--	--
benzo[g,h,i]perylene	--	250J	--	--	--	--	--
<u>Pesticides/PCBs</u>							
Heptachlor epoxide	--	--	--	--	--	--	27
<u>Analyte Detected</u> (values in mg/kg)							
aluminum	8,120	8,050	5,750	9,830	8,560	6,620	7,860
arsenic	7.3JN	3.6JN	3.3JN	3.4JN	4.3JN	2.9JN	4.2JN
barium	209	111	50.1B	68.5	111	103	109
beryllium	0.49B	0.48JB	0.38JB	0.46JB	0.54JB	0.49JB	0.52JB
cadmium	--	4.1N*	--	--	--	--	--
calcium	35,000	18,400	37,000	61,500	8,530	8,550	16,000
chromium	13.3	16.9	12.1	14.5	10.7	9.0	12
cobalt	9.3JBN	10.2JBN	6.3JBN	7JBN	10.1JBN	6.6JBN	8JBN
copper	22.7	12.2J	9.1J	9.4J	9.5J	8.6J	11.8J
iron	26,600	14,900	15,500	18,200	14,200	11,600	15,200
lead	25.6JN	29.8JN	18JN	82.5JN+	16.6JN	8.2JN	27.7JN
magnesium	7,670	9,520	16,000	18,900	5,420	4,560	9,770
manganese	1,610	786	316	376	775	658	603
nickel	21.7	17.4	15.2	17.3	12.7	10.2	17.6
potassium	1,450B	992B	1,040B	2,060	441B	896B	543B
sodium	339B	104B	213B	303B	137B	52.2B	73.2B
vanadium	26.9	24.4	18.4	26.6	23.3	20.7	25.7
zinc	125	94.6	64.6	74.6	56.3	55.1	50.2
-- Not detected.							

Table 4-1 (Cont.)

COMPOUND QUALIFIERS	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semiquantitative.
B	This flag is used when the compound is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.	Compound value may be semiquantitative if it is <5x the blank concentration (<10x the blank concentrations for common laboratory artifacts: phthalates, methylene chloride, acetone, toluene, 2-butanone).
D	This flag identifies all compounds identified in an analysis at a secondary dilution factor.	Alerts data user to a possible change in the CRQL. Data is quantitative.
ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
N	Spike recoveries outside QC protocols, which indicates a possible matrix problem. Data may be biased high or low. See spike results and laboratory narrative.	Value may be quantitative or semiquantitative.
*	Duplicate value outside QC protocols which indicates a possible matrix problem.	Value may be quantitative or semiquantitative.
+	Correlation coefficient for standard additions is less than 0.995. See review and laboratory narrative.	Data value may be biased.
B	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semiquantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

Table 4-2
RESULTS OF CHEMICAL ANALYSIS OF
FIT-COLLECTED MONITORING WELL SAMPLES

Sample Collection Information and Parameters	Sample Number					
	MW1	MW2	MW3	Duplicate	Blank 1	Blank 2
Date	3/22/89	3/21/89	3/21/89	3/21/89	3/21/89	3/22/89
Time	0930	1250	1530	1530	1700	1115
CLP Organic Traffic Report Number	EW179	EW181	EW182	EW180	EW183	EW184
CLP Inorganic Traffic Report Number	MEDA98	MEW990	MEW991	MEW989	MEW992	MEW993
Temperature (°C)	*	10.0	6.0	6.0	9.0	9.0
Specific Conductivity (μmhos/cm)	*	350	350	350	0	0
<u>Compound Detected</u>						
(values in μg/L)						
<u>Volatile Organics</u>						
vinyl chloride	8J	--	33	45	--	--
chloroethane	--	--	6J	7J	--	--
methylene chloride	--	3J	66	73	--	5
acetone	2J	--	2J	--	8J	7J
carbon disulfide	4J	5J	5J	--	--	--
1,1-dichloroethane	--	--	39	53	--	--
1,2-dichloroethene (total)	--	--	400D	390D	--	--
chloroform	--	--	--	--	5	5
trichloroethene	--	--	180	210D	--	--
benzene	--	--	10	16	--	--
tetrachloroethene	--	--	97	150	--	--
toluene	--	--	10	12	--	--
ethylbenzene	--	--	--	3J	--	--
xylene (total)	--	--	17	24	--	--
<u>Semivolatile Organics</u>						
di-n-butylphthalate	--	--	--	--	2J	--

Table 4-2 (Cont.)

Sample Collection Information and Parameters	Sample Number					
	MW1	MW2	MW3	Duplicate	Blank 1	Blank 2
<u>Analyte Detected</u>						
(values in $\mu\text{g/L}$)						
aluminum	25,900	--	97.1B	110B	--	--
arsenic	8.3B	--	4.8B	5.9B	--	--
barium	195B	26.5B	173B	166B	--	--
calcium	264,000	87,800	227,000	217,000	--	--
chromium	58.3	--	--	--	--	--
cobalt	20.5B	--	23.5	22.1B	--	--
copper	86.1J	8.9JB	--	--	32J	33.8J
iron	34,100	21JB	9,040	8,610	11.1JB	26.3JB
lead	54.9JN+	--	--	--	--	2.8JBN
magnesium	119,000	37,400	63,500	62,400	--	--
manganese	907	4.3B	2,750	2,660	--	--
nickel	43	--	--	19B	--	--
potassium	9,660	--	7,680	7,920	--	--
silver	--	4.2B	--	--	--	--
sodium	136,000	4,760B	2,020,000	1,920,000	304B	290B
vanadium	68.7	--	7.8B	5.4B	--	--
zinc	1,950J	65.9J	72.3J	119J	27.8J	26.9J

* Insufficient quantity was obtained for measurement.

-- Not detected.

Table 4-2 (Cont.)

COMPOUND QUALIFIERS	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semiquantitative.
D	This flag identifies all compounds identified in an analysis at a secondary dilution factor.	Alerts data user to a possible change in the CRQL. Data is quantitative.
ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
N	Spike recoveries outside QC protocols, which indicates a possible matrix problem. Data may be biased high or low. See spike results and laboratory narrative.	Value may be quantitative or semi-quantitative.
+	Correlation coefficient for standard additions is less than 0.995. See review and laboratory narrative.	Data value may be biased.
B	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semi-quantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

Table 4-3
RESULTS OF CHEMICAL ANALYSIS OF
FIT-COLLECTED RESIDENTIAL WELL SAMPLES

Sample Collection Information and Parameters	Sample Number				
	RW1	Duplicate	RW2	RW3	Blank
Date	3/22/89	3/22/89	3/22/89	3/22/89	3/22/89
Time	0930	0930	1200	1030	1115
CLP Organic Traffic Report Number	EDL18	EDL19	EDL20	EDL21	EW178
CLP Inorganic Traffic Report Number	MEDA92	MEDA93	MEDA94	MEDA95	MEDA97
Temperature (°C)	8.0	8.0	9.0	10.0	--
Specific Conductivity (μmhos/cm)	390	390	490	510	--
<u>Compound Detected</u>					
(values in μg/L)					
<u>Volatile Organics</u>					
chloroform	--	--	--	2	--
bromodichloromethane	--	--	--	0.8J	--
<u>Semivolatile Organics</u>					
phenol	--	1J	3	1J	2
anthracene	3	--	--	--	--
<u>Analyte Detected</u>					
(values in μg/L)					
barium	85.2	84.5	32.6B	57.2	--
calcium	71,500	68,800	76,800	88,400	71.2B
chromium	--	--	32.4	--	--
copper	--	--	29.2J	32.7J	52.4
iron	1,570	1,590	1,090	--	16.2B
magnesium	30,700	30,100	33,900	39,100	13.8B
manganese	28.3	31.8	49.3	--	3.8B
sodium	4,120	4,000	2,920	4,470	215B
zinc	13.8B	18.5B	43.8	54.3	19.4B

-- Not detected.

Table 4-3 (Cont.)

COMPOUND QUALIFIER	DEFINITION	INTERPRETATION
J	Indicates an estimated value.	Compound value may be semiquantitative.

ANALYTE QUALIFIERS	DEFINITION	INTERPRETATION
B	Value is real, but is above instrument DL and below CRDL.	Value may be quantitative or semi-quantitative.
J	Value is above CRDL and is an estimated value because of a QC protocol.	Value may be semiquantitative.

Source: Ecology and Environment, Inc. 1990.

5. DISCUSSION OF MIGRATION PATHWAYS

5.1 INTRODUCTION

This section contains a discussion of data and information that apply to potential migration pathways and targets of TCL compounds and/or TAL analytes that possibly are attributable to the BML site.

The five migration pathways of concern discussed are groundwater, surface water, air, fire and explosion, and direct contact.

5.2 GROUNDWATER

The general geology of the area of the site consists of unconsolidated deposits of clay and silt from the surface to an average depth of 25 feet. These deposits overlie a sand and gravel deposit with traces of clay intermixed. The sand and gravel deposit is approximately 245 feet thick and tends to rise toward the ground surface along the eastern boundary of the site, so that 1 mile east of the site the deposit is actually only several feet from the surface. Approximately 270 feet below the sand and gravel deposit is a bedrock layer, the Galena-Platteville dolomite, which is hydrologically connected to the sand and gravel deposit (well logs are provided in Appendix E [IEPA 1981; Hooper no date]).

The unconsolidated glacial deposits of clay and silt do not appear to be continuous throughout a 3-mile radius of the site. According to water well records, the aquifer of concern in the 3-mile radius of the site is the sand and gravel deposit and the Galena-Platteville dolomite. Based on groundwater elevations in monitoring wells, as measured by FIT

and as suggested by surficial topography at the site, the likely direction of groundwater flow is toward the southeast.

TCL compounds and TAL analytes were detected in groundwater monitoring wells on-site. The concentrations of the TCL compounds detected in MW3 (vinyl chloride at 45 µg/L, 1,1-dichloroethane at 53 µg/L, 1,2-dichloroethene at 400 µg/L, benzene at 16 µg/L, tetrachloroethene at 150 µg/L, and total xylenes at 24 µg/L) were above the concentrations detected in the background monitoring well (assumed to be MW1). Vinyl chloride was also detected in MW1 at 8J µg/L (see Table 4-2 for definition of J qualifier). TAL analytes detected in MW1 were soil constituents common to the area.

TCL compounds and TAL analytes were detected in soil samples collected on-site. The concentrations of TCL compounds (chloroethane at 31 µg/kg, 1,1-dichloroethane at 250 µg/kg, carbon tetrachloride at 29 µg/kg, toluene at 220 µg/kg, ethylbenzene at 46 µg/kg, styrene at 15 µg/kg, fluoranthene at 1,100 µg/kg, and total xylenes at 85 µg/kg) were all above the concentrations detected in the background soil sample, S7. All TCL compounds listed above were detected in soil sample S4, except fluoranthene, which was detected in soil sample S2.

An observed release of TCL compounds to groundwater at the site is documented, based on the following information.

- TCL compounds 1,1-dichloroethane and total xylenes were detected in both on-site soil samples and in downgradient monitoring well sample MW3. Neither of these two compounds was detected in the upgradient well sample.
- The landfilling process at the site potentially affects the direction of surface water flow. This may account for the TCL compounds detected in soil sample S4, which was collected approximately 700 feet south-southeast of monitoring well MW3.
- The BML site does not have a liner or leachate collection system to protect the groundwater from TCL compounds leaching from the landfill (Klint et al. 1989).

- The aquifer of concern consists of the moderately permeable sand and gravel deposit and the underlying Galena-Platteville dolomite. In the immediate vicinity of the site, the depth to the aquifer of concern is relatively shallow, approximately 25 feet.
- A potential source of the TCL compounds detected may be the diesel fuel tank, which, according to an employee of the landfill operator, was abandoned nearly full but has now leaked 75% of its contents.

The potential targets of groundwater contamination include approximately 16,500 persons residing within a 3-mile radius of the site who obtain drinking water from municipal or private wells drawing from the sand and gravel deposit or the underlying Galena-Platteville dolomite, which together constitute the aquifer of concern.

The city of Belvidere operates eight municipal wells. The closest to the site is Municipal Well #9, which is approximately 1 1/4 miles south-southwest of the site, and the most distant is Municipal Well #8, approximately 3 3/4 miles south-southwest of the site. Water from all eight wells is blended in a distribution system (Grimes 1988). Approximately 15,200 persons obtain drinking water from the Belvidere Municipal Water System on a continual basis.

According to Jim Grimes of the Belvidere Water Works, the city of Belvidere Municipal Water System serves residents within the city of Belvidere proper. A house count from a USGS topographic map of the area (USGS 1975, 1975a, 1975b, 1978), multiplied by 2.92, the 1980 Census persons-per-household average in Boone County (U.S. Bureau of the Census 1982), indicates that an estimated 1,300 persons reside within a 3-mile radius of the site but outside the area served by the city of Belvidere Municipal Water System. According to Illinois Department of Public Health well construction reports, these residents obtain drinking water from private wells screened in the aquifer of concern at depths ranging from approximately 40 to 500 feet. The nearest well to the site is located approximately 500 feet south of the site and provides water for approximately 100 residents.

5.3 SURFACE WATER

Surface water samples were not collected at the BML site because no continually flowing surface water exists on-site or in the immediate vicinity of the site.

The surface water nearest to the site is Beaver Creek, located approximately 1 1/4 miles northeast of the site. The potential for contaminants to migrate from the site to this tributary via overland flow is limited, based on the following information:

- The site is at a lower elevation than Beaver Creek; and
- Route 76 separates Beaver Creek from the BML site.

5.4 AIR

A release of potential contaminants to the air was not documented during the SSI of the BML site. During the reconnaissance inspection, FIT site-entry instruments (OVA 128, combination oxygen meter and explosimeter, hydrogen cyanide monitor, and radiation monitor) did not detect levels above background concentrations at the site in the breathing zone (E & E 1987). However, along surficial cracks in the top of the landfill, the OVA 128 did detect a concentration above background.

A potential does exist for windblown particulates to carry TCL compounds and TAL analytes from the site because TCL compounds and TAL analytes were detected in surface soils on-site and because vegetative cover is sparse in some areas of the site. According to a house count from USGS topographic maps of the site area (USGS 1975, 1975a, 1975b, 1978), multiplied by 2.92, the 1980 Census persons-per-household average for Boone County, the population within a 4-mile radius of the site is approximately 17,055 persons.

5.5 FIRE AND EXPLOSION

A slight potential exists for fire and explosion at the BML site. FIT on-site safety equipment (OVA 128 with charcoal filter) detected unknown concentrations of methane at the landfill surface. Other on-

site safety equipment (explosimeter and oxygen meter) did not register any readings.

This potential also exists due to the presence of the leaking diesel fuel storage tank on-site.

5.6 DIRECT CONTACT

According to federal, state, and local file information reviewed by FIT, there is no documentation of an incident of direct contact with TCL compounds and/or TAL analytes at the BML site.

FIT observed no signs of casual use of the site during the SSI, but there is a potential that the public may come into direct contact with TCL compounds and TAL analytes detected at the site. The potential for direct contact is based on the following information:

- TCL compounds have been detected at the site in soil samples collected from the ground surface;
- On-site landfilling may potentially expose site workers to TCL compounds; and
- Residents have access to the site to deposit waste on designated days.

According to a house count from USGS topographic maps of the area of the site (USGS 1975, 1975a, 1975b, 1978), multiplied by 2.92, the 1980 Census persons-per-household average in Boone County, the population within a 1-mile radius of the site is approximately 210 persons.

6. BIBLIOGRAPHY

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3754:6

APPENDIX A

SITE 4-MILE RADIUS MAP

SDMS US EPA Region V

Imagery Insert Form



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Appendix A – 4-mile radius map



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APPENDIX B

U.S. EPA FORM 2070-13

APPENDIX C

FIT SITE PHOTOGRAPHS

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 1 OF 20
 U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845A

DATE: 3-22-89

TIME: 1330

DIRECTION OF
 PHOTOGRAPH:
NE

WEATHER
 CONDITIONS:
20°F

clear, sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
 (if applicable):
N/A



DESCRIPTION: Photograph of entrance gate with landfill and scale house in background.

DATE: 3-22-89

TIME: 1300

DIRECTION OF
 PHOTOGRAPH:
W

WEATHER
 CONDITIONS:
20°F

clear, sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
 (if applicable):
N/A



DESCRIPTION: Photograph from top of landfill of area to be capped in the spring of 1989.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 2 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-22-89TIME: 1300DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:20°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph from top of landfill at west
end where active land filling starts.DATE: 3-22-89TIME: 1310DIRECTION OF
PHOTOGRAPH:NEWEATHER
CONDITIONS:20°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph from top of landfill standing
on daily cover material with active land filling area
in background. End loader covering refuse with daily cover.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 3 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-22-89TIME: 1305DIRECTION OF
PHOTOGRAPH:SWWEATHER
CONDITIONS:20°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph from top of landfill of
active landfilling area with stockpiled daily cover
material in background. Also future landfilling area in background.DATE: 3-22-89TIME: 1305DIRECTION OF
PHOTOGRAPH:SWEATHER
CONDITIONS:20°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph from top of landfill with active
landfilling area in foreground.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 4 OF 20

U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FIL05845A

DATE: 3-21-89

TIME: 1000

DIRECTION OF
PHOTOGRAPH:
S

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
N/A



DESCRIPTION: Photograph of intersection between area
with final cap (right) and area to be capped
in the spring of 1989 (left).

DATE: 3-21-89

TIME: 1040

DIRECTION OF
PHOTOGRAPH:
SW

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
N/A



DESCRIPTION: Photograph of area to be capped with
final cover and stockpiled daily cover material
in right of photograph.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 5 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1620DIRECTION OF
PHOTOGRAPH:NWWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PergichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph of area to be capped in
spring of 1989 and methane collection pipes in right
of photograph which were abandoned.DATE: 3-22-89TIME: 1310DIRECTION OF
PHOTOGRAPH:NEWEATHER
CONDITIONS:20°Fclear, sunny

PHOTOGRAPHED BY:

Wm PergichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph taken from access road
with stained soil along side roadway in center
of photograph.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 6 OF 20

U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845A

DATE: 3-21-89

TIME: 1745

DIRECTION OF
PHOTOGRAPH:
N

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
N/A



DESCRIPTION: Photograph taken from active fill area
showing depth of of daily cover.

DATE: 3-21-89

TIME: 1740

DIRECTION OF
PHOTOGRAPH:
S

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
N/A



DESCRIPTION: Photograph taken from active fill area
of future landfill area.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 7 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5843ADATE: 3-22-89TIME: 1320DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:20°Fclear, Sunny

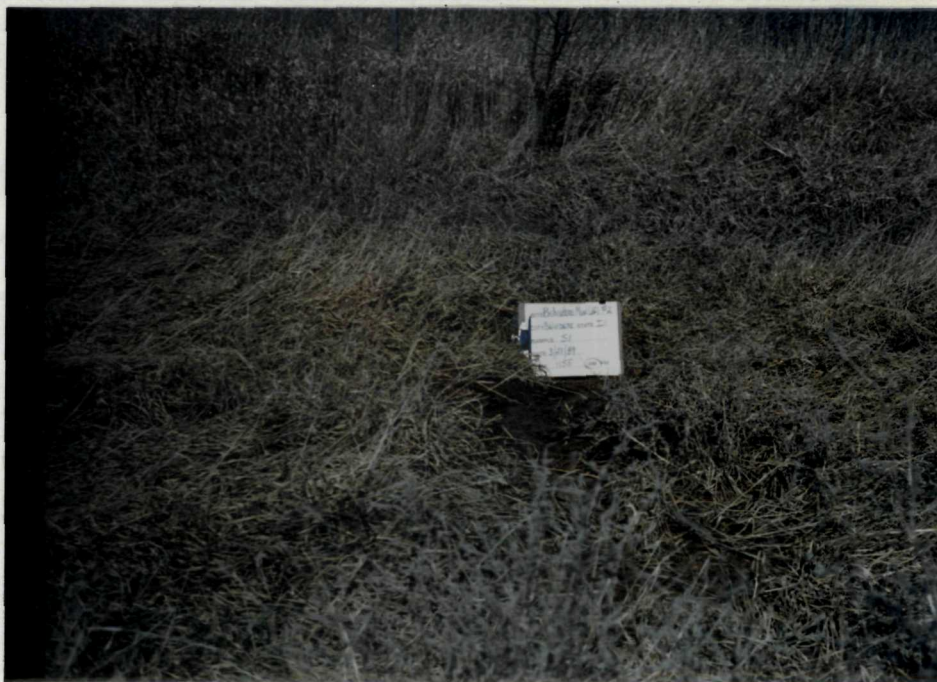
PHOTOGRAPHED BY:

Wm PergichSAMPLE ID
(if applicable):N/ADESCRIPTION: Photograph of underground tank on site
which was brought to landfill empty.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belydere Municipal Landfill #2 PAGE 8 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1155DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°F.clear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):51DESCRIPTION: Close up photograph of 51. Sample was collected at the surface along the fence on the north side.DATE: 3-21-89TIME: 1155DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):51DESCRIPTION: Perspective photograph of 51. Sample taken below erosion gully.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belydere Municipal Landfill #2 PAGE 9 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1215DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):52DESCRIPTION: Close up photograph of 52. Sample collected
at surface along the fence on the north side of landfill.DATE: 3-21-89TIME: 1215DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):52DESCRIPTION: Perspective photograph of 52.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 10 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FIL05845ADATE: 3-21-89TIME: 1440DIRECTION OF
PHOTOGRAPH:NNEWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):53DESCRIPTION: Close up photograph of S3. Sample collected
along south slope of landfill in area of stained
soil.DATE: 3-21-89TIME: 1440DIRECTION OF
PHOTOGRAPH:NNEWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):53DESCRIPTION: Perspective photograph of S3.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 11 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1500DIRECTION OF
PHOTOGRAPH:NNEWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):54DESCRIPTION: Close up photograph of 54. Sample
collected at surface in area of stained soil.DATE: 3-21-89TIME: 1500DIRECTION OF
PHOTOGRAPH:NNEWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):54DESCRIPTION: Perspective photograph of 54.

SITE NAME: Belydere Municipal Landfill #2 PAGE 12 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1530DIRECTION OF
PHOTOGRAPH:NWWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):55DESCRIPTION: close up photograph of 55. Sample collected at surface of landfill in area with erosion.DATE: 3-21-89TIME: 1530DIRECTION OF
PHOTOGRAPH:NWWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):55DESCRIPTION: Perspective photograph of 55.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 13 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1615DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):56DESCRIPTION: close up photograph of 56. Sample collected
at surface on slope at west end of landfill.DATE: 3-21-89TIME: 1615DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):56DESCRIPTION: Perspective photograph of 56.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belydere Municipal Landfill #2 PAGE 14 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-21-89TIME: 1640DIRECTION OF
PHOTOGRAPH:EWEATHER
CONDITIONS:30°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):57DESCRIPTION: close up photograph of 57 which is
the background sample collected in the southeast
corner of Route 76 and Woodstock Road.DATE: 3-21-89TIME: 1640DIRECTION OF
PHOTOGRAPH:EWEATHER
CONDITIONS:30°Fclear, sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):57DESCRIPTION: Perspective photograph of 57.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 15 OF 20

U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845A

DATE: 3-22-89

TIME: 930

DIRECTION OF
PHOTOGRAPH:

N

WEATHER
CONDITIONS:

20°F

clear, sunny

PHOTOGRAPHED BY:

Wm Perpich

SAMPLE ID
(if applicable):

MW1



DESCRIPTION: close up photograph of MW1.

DATE: 3-22-89

TIME: 930

DIRECTION OF
PHOTOGRAPH:

N

WEATHER
CONDITIONS:

20°F

clear, sunny

PHOTOGRAPHED BY:

Wm Perpich

SAMPLE ID
(if applicable):

MW1



DESCRIPTION: Perspective photograph of MW1

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belydere Municipal Landfill #2PAGE 16 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021PAN: FILO5845ADATE: 3-21-89TIME: 1250DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):MW2DESCRIPTION: Close up photograph of MW2.DATE: 3-21-89TIME: 1250DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:30°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):MW2DESCRIPTION: Perspective photograph of MW2.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 17 OF 20

U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILE05843A

DATE: 3-21-89

TIME: 1530

DIRECTION OF
PHOTOGRAPH:
N

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
MW3



DESCRIPTION: Close up photograph of MW3.

DATE: 3-21-89

TIME: 1530

DIRECTION OF
PHOTOGRAPH:
N

WEATHER
CONDITIONS:
30°F

clear, Sunny

PHOTOGRAPHED BY:
Wm Perpich

SAMPLE ID
(if applicable):
MW3



DESCRIPTION: Perspective photograph of MW3. Photograph taken after completion of sampling.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 18 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FIL05845ADATE: 3-22-89TIME: 930DIRECTION OF
PHOTOGRAPH:SWWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):RW1DESCRIPTION: Close up photograph of RW1.DATE: 3-22-89TIME: 930DIRECTION OF
PHOTOGRAPH:SWWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):RW1DESCRIPTION: Perspective photograph of RW1.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 19 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FIL05845ADATE: 3-22-89TIME: 1200DIRECTION OF
PHOTOGRAPH:WWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):RW2DESCRIPTION: close up photograph of RW2.DATE: 3-22-89TIME: 1200DIRECTION OF
PHOTOGRAPH:WWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PerpichSAMPLE ID
(if applicable):RW2DESCRIPTION: Perspective photograph of RW2.

FIELD PHOTOGRAPHY LOG SHEET

SITE NAME: Belvidere Municipal Landfill #2 PAGE 20 OF 20U.S. EPA ID: ILD00605113 TDD: F05-8902-021 PAN: FILO5845ADATE: 3-22-89TIME: 1030DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PergichSAMPLE ID
(if applicable):RW3DESCRIPTION: close up photograph of RW3DATE: 3-22-89TIME: 1030DIRECTION OF
PHOTOGRAPH:NWEATHER
CONDITIONS:20°Fclear, Sunny

PHOTOGRAPHED BY:

Wm PergichSAMPLE ID
(if applicable):RW3DESCRIPTION: Perspective photograph of RW3.

APPENDIX D

U.S. EPA TARGET COMPOUND LIST AND
TARGET ANALYTE LIST
QUANTITATION/DETECTION LIMITS

ADDENDUM A

**ROUTINE ANALYTICAL SERVICES
CONTRACT REQUIRED DETECTION AND QUANTITATION LIMITS**

Contract Laboratory Program
Target Compound List
Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Chloromethane	74-87-3	10 ug/L	10 ug/Kg
Bromomethane	74-83-9	10	10
Vinyl chloride	75-01-4	10	10
Chloroethane	75-00-3	10	10
Methylene chloride	75-09-2	5	5
Acetone	67-64-1	10	5
Carbon disulfide	75-15-0	5	5
1,1-dichloroethene	75-35-4	5	5
1,1-dichloroethane	75-34-3	5	5
1,2-dichloroethene (total)	540-59-0	5	5
Chloroform	67-66-3	5	5
1,2-dichloroethane	107-06-2	5	5
2-butanone (MEK)	78-93-3	10	10
1,1,1-trichloroethane	71-55-6	5	5
Carbon tetrachloride	56-23-5	5	5
Vinyl acetate	108-05-4	10	10
Bromodichloromethane	75-27-4	5	5
1,2-dichloropropane	78-87-5	5	5
cis-1,3-dichloropropene	10061-01-5	5	5
Trichloroethene	79-01-6	5	5
Dibromochloromethane	124-48-1	5	5
1,1,2-trichloroethane	79-00-5	5	5
Benzene	71-43-2	5	5
Trans-1,3-dichloropropene	10061-02-6	5	5
Bromoform	75-25-2	5	5
4-Methyl-2-pentanone	108-10-1	10	10
2-Hexanone	591-78-6	10	10
Tetrachloroethene	127-18-4	5	5
Tolene	108-88-3	5	5
1,1,2,2-tetrachloroethane	79-34-5	5	5
Chlorobenzene	108-90-7	5	5
Ethyl benzene	100-41-4	5	5
Styrene	100-42-5	5	5
Xylenes (total)	1330-20-7	5	5

Table A
Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SEDIMENT SLUDGE
Phenol	108-95-2	10 ug/L	330 ug/Kg
bis(2-Chloroethyl) ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
1,4-Dichlorobenzene	106-46-7	10	330
Benzyl Alcohol	100-51-6	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
bis(2-Chloroisopropyl) ether	108-60-1	10	330
4-Methylphenol	106-44-5	10	330
N-Nitroso-di-n-dipropylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
Benzoic Acid	65-85-0	50	1600
bis(2-Chloroethoxy) methane	111-91-1	10	330
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachlorobutadiene	87-68-3	10	300
4-Chloro-3-methylphenol	59-50-7	10	330
2-Methylnaphthalene	91-57-6	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	50	1600
2-Chloronaphthalene	91-58-7	10	330
2-Nitroaniline	88-74-4	50	1600
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330
2,6-Dinitrotoluene	606-20-2	10	330
3-Nitroaniline	99-09-2	50	1600
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	50	1600
4-Nitrophenol	100-02-7	50	1600
Dibenzofuran	132-64-9	10	330
2,4-Dinitrotoluene	121-14-2	10	330
Diethylphthalate	84-66-2	10	330
4-Chlorophenyl-phenyl ether	7005-72-3	10	330

Table A
Contract Laboratory Program
Target Compound List
Semivolatiles Quantitation Limits

COMPOUND	CAS #	WATER	SOIL SLUDGE SEDIMENT
Fluorene	86-73-7	10 ug/L	330 ug/Kg
4-Nitroaniline	100-01-6	50	1600
4,6-Dinitro-2-methylphenol	534-52-1	50	1600
N-nitrosodiphenylamine	86-30-6	10	330
4-Bromophenyl-phenylether	101-55-3	10	330
Hexachlorobenzene	118-74-1	10	330
Pentachlorophenol	87-86-5	50	1600
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Di-n-butylphthalate	84-74-2	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
Butylbenzylphthalate	85-68-7	10	330
3,3'-Dichlorobenzidine	91-94-1	20	660
Benzo(a)anthracene	56-55-3	10	330
Chrysene	218-01-9	10	330
bis(2-Ethylhexyl)phthalate	117-81-7	10	330
Di-n-octylphthalate	117-84-0	10	330
Benzo(b)fluoranthene	205-99-2	10	330
Benzo(k)fluoranthene	207-08-9	10	330
Benzo(a)pyrene	50-32-8	10	330
Indeno(1,2,3-cd)pyrene	193-39-5	10	330
Dibenz(a,h)anthracene	53-70-3	10	330
Benzo(g,h,i)perylene	191-24-2	10	330

Table A
Contract Laboratory Program
Target Compound List
Pesticide and PCB Quantitation Limits

COMPOUND	CAS #	SOIL SEDIMENT SLUDGE	
		WATER	
alpha-BHC	319-84-6	0.05 ug/L	8 ug/Kg
beta-BHC	319-85-7	0.05	8
delta-BHC	319-86-8	0.05	8
gamma-BHC (Lindane)	58-89-9	0.05	8
Heptachlor	76-44-8	0.05	8
Aldrin	309-00-2	0.05	8
Heptachlor epoxide	1024-57-3	0.05	8
Endosulfan I	959-98-8	0.05	8
Dieldrin	60-57-1	0.10	16
4,4'-DDE	72-55-9	0.10	16
Endrin	72-20-8	0.10	16
Endosulfan II	33213-65-9	0.10	16
4,4'-DDD	72-54-8	0.10	16
Endosulfan sulfate	1031-07-8	0.10	16
4,4'-DDT	50-29-3	0.10	16
Methoxychlor (Mariate)	72-43-5	0.5	80
Endrin ketone	53494-70-5	0.10	16
alpha-Chlordane	5103-71-9	0.5	80
gamma-chlordane	5103-74-2	0.5	80
Toxaphene	8001-35-2	1.0	160
AROCLOR-1016	12674-11-2	0.5	80
AROCLOR-1221	11104-28-2	0.5	80
AROCLOR-1232	11141-16-5	0.5	80
AROCLOR-1242	53469-21-9	0.5	80
AROCLOR-1248	12672-29-6	0.5	80
AROCLOR-1254	11097-69-1	1.0	160
AROCLOR-1260	11096-82-5	1.0	160

Table A
Contract Laboratory Program
Target Analyte List
Inorganic Quantitation Limits

COMPOUND	PROCEDURE	SOIL WATER	SEDIMENT SLUDGE
Aluminum	ICP	200 ug/L	40 mg/Kg
Antimony	Furnace	60	2.4
Arsenic	Furnace	10	2
Barium	ICP	200	40
Beryllium	ICP	5	1
Cadmium	ICP	5	1
Calcium	ICP	5000	1000
Chromium	ICP	10	2
Cobalt	ICP	50	10
Copper	ICP	25	5
Iron	Icp	100	20
Lead	Furnace	5	1
Magnesium	ICP	5000	1000
Manganese	ICP	15	3
Mercury	Cold Vapor	0.2	0.008
Nickel	ICP	40	8
Potassium	ICP	5000	1000
Selenium	Furnace	5	1
Silver	ICP	10	2
Sodium	ICP	5000	1000
Thallium	Furnace	10	2
Vanadium	ICP	50	10
Zinc	ICP	20	4
Cyanide	Color	10	2

ADDENDUM C
SPECIAL ANALYTICAL SERVICES
DETECTION LIMITS

Drinking Water Samples

TABLE C
SPECIAL ANALYTICAL SERVICES DRINKING WATER
VOLATILE QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT IN REAGENT WATER
Benzene	71-43-2	1.5 ug/L
Bromodichloromethane	75-27-4	1.5
Bromoform	75-25-2	1.5
Bromomethane	74-83-9	1.5
Carbon tetrachloride	56-23-5	1.5
Chlorobenzene	108-90-7	1.5
Chloroethane	75-00-3	1.5
2-Chloroethyl vinyl ether	110-75-8	1.5
Chloroform	67-66-3	1.5
Chloromethane	74-87-3	1.5
Dibromochloromethane	124-48-1	1.5
1,1-Dichloroethane	75-34-3	1.5
1,2-Dichloroethane	107-06-2	1.5
1,1-Dichloroethene	75-35-4	1.5
Total-1,2-Dichloroethene	540-59-0	1.5
1,2-Dichloropropane	78-87-5	1.5
cis-1,3-Dichloropropene	10061-01-5	2
trans-1,3-Dichloropropene	10061-02-6	1
Ethyl benzene	100-41-4	1.5
Methylene chloride *	75-09-2	1
1,1,2,2-Tetrachloroethane	79-34-5	1.5
Tetrachloroethene	127-18-4	1.5
Toluene *	108-88-3	1.5
1,1,1-Trichloroethane	71-55-6	1.5
1,1,2-Trichloroethane	79-00-5	1.5
Trichloroethene	79-01-6	1.5
Vinyl chloride	75-01-4	1.5
Acrolein	107-02-8	25
Acetone *	67-64-1	5
Acrylonitrile	107-13-1	25
Carbon disulfide	75-15-0	3
2-Butanone	78-93-3	5
Vinyl acetate	108-05-4	5
4-Methyl-2-pentanone	108-10-1	1.5
2-Hexanone	519-78-6	5
Styrene	100-42-5	1
Xylene (total)	1330-02-7	1.5

- * Common laboratory solvents.
Blank limit is 5x method detection limit.
() Values in parentheses are estimates.
actual values are being determined at this time.

TABLE C (cont.)
SAS DRINKING WATER
SEMIVOLATILES QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aniline	62-53-3	1.5 ug/l
Bis(2-chloroethyl)ether	111-44-4	1.5
Phenol	108-95-2	2
2-Chlorophenol	95-57-3	2
1,3-Dichlorobenzene	541-73-1	2
1,4-Dichlorobenzene	106-46-7	2
1,2-Dichlorobenzene	95-50-1	2.5
Benzyl alcohol	100-51-6	2
Bis(2-chloroisopropyl)ether	39638-32-9	2.5
2-Methylphenol	95-48-7	1
Hexachloroethane	67-72-1	2
n-Nitrosodipropylamine	621-64-7	1.5
Nitrobenzene	98-95-3	2.5
4-Methylphenol	106-44-5	1
Isophorone	78-59-1	2.5
2-Nitrophenol	88-75-5	2
2,4-Dimethylphenol	105-67-9	2
Bis(2-Chloroethoxy)methane	111-91-1	2.5
2,4-Dichlorophenol	120-83-2	2
1,2,4-Trichlorobenzene	120-82-1	2
Naphthalene	91-20-3	2
4-Chloroaniline	106-47-8	2
Hexachlorobutadiene	87-68-3	2.5
Benzoic Acid	65-85-0	20
2-Methylnapthalene	91-57-6	2
4-Chloro-3-methylphenol	59-50-7	1.5
Hexachlorocyclopentadiene	77-47-4	2
2,4,6-Trichlorophenol	88-06-2	1.5
2,4,5-Trichlorophenol	95-95-4	1.5
2-Chloronapthalene	91-58-7	1.5
Acenaphthylene	208-96-8	1.5
Dimethyl phthalate	131-11-3	1.5
2,6-Dinitrotoluene	606-20-2	1
Acenaphthene	83-32-9	1.5
3-Nitroaniline	99-09-2	2.5
Dibenzofuran	132-64-9	1
2,4-Dinitrophenol	51-28-5	(15)
2,4-Dinitrotoluene	121-14-2	1

TABLE C (Cont.)
SAS DRINKING WATER
SEMIVOLATILE QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Fluorene	86-73-7	1 ug/L
4-Nitrophenol	100-02-7	1.5
4-Chlorophenyl phenyl ether	7005-72-3	1
Diethyl phthalate	84-66-2	1
4,6-Dinitro-2-methylphenol	534-52-1	(15)
1,2-Diphenylhydrazine	122-66-7	1
n-Nitrosodiphenylamine *	86-30-6	
Diphenylamine *	122-39-4	1.5
4-Nitroaniline	100-01-6	3
4-Bromophenyl-phenylether	101-55-3	1.5
Hexachlorobenzene	118-74-1	1.5
Pentachlorophenol	87-86-5	2
Phenanthrene	85-01-8	1
Anthracene	120-12-7	2.5
di-n-Butyl phthalate	84-74-2	2
Fluoranthene	206-44-0	1.5
Pyrene	129-00-0	1.5
Butyl benzyl phthalate	85-68-7	3.5
Chrysene **	218-01-9	
Benzo(A)Anthracene **	56-55-3	1.5
bis(2-ethylhexyl)phthalate	117-81-7	1
di-n-Octyl phthalate	117-84-0	1.5
Benzo(b)fluoranthene ***	205-99-2	
Benzo(k)fluoranthene ***	207-08-9	1.5
Benzo(a)pyrene	50-32-8	2
Indeno(1,2,3-cd)pyrene	193-39-5	3.5
Dibenzo(a,h)anthracene	53-70-3	2.5
Benzo(g,h,i)perylene	191-24-2	4
2-Nitroaniline	88-74-4	1

* These two parameters are reported as a total.

** These two parameters are reported as a total.

*** These two parameters are reported as a total.

() Values in parentheses are estimates.

The actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE C (Cont.)
SAS DRINKING WATER
PESTICIDE AND PCB QUANTITATION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aldrin	309-00-2	0.005 ug/L
alpha BHC	319-84-6	0.010
beta BHC	319-85-7	0.005
delta BHC	319-86-8	0.005
gamma BHC (Lindane)	58-89-9	0.005
alpha-Chlordane	5103-71-9	0.020
gamma-Chlordane	5103-74-2	0.020
4,4'-DDD	72-54-8	0.020
4,4'-DDE	72-55-9	0.005
4,4'-DDT	50-29-3	0.020
Dieldrin	60-57-1	0.010
Endosulfan I	959-98-8	0.010
Endosulfan II	33213-65-9	0.010
Endosulfan sulfate	1031-07-8	0.10
Endrin	72-20-8	0.010
Endrin Aldehyde	7421-93-4	(0.030)
Endrin Ketone	53494-70-5	0.030
Heptachlor	76-44-8	0.030
Heptachlor Epoxide	1024-57-3	0.005
4,4'-Methoxychlor	72-43-5	0.020
Toxaphene	8001-35-2	0.25
Aroclor-1016	12674-11-2	0.10
Aroclor-1221	11104-28-2	0.10
Aroclor-1232	11141-16-5	0.10
Aroclor-1242	53469-21-9	0.10
Aroclor-1248	12672-29-6	0.10
Aroclor-1254	11097-69-1	0.10
Aroclor-1260	11096-82-5	0.10

() Values in parentheses are estimates.
Actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE C (Cont.)
SAS DRINKING WATER
INORGANIC DETECTION LIMITS

PARAMETER	PROCEDURE	DETECTION LIMIT
Aluminum	ICP	100
Antimony	GFAA	5
Arsenic	GFAA	5
Barium	ICP	50
Beryllium	ICP	5
Cadmium	GFAA	0.5
Calcium	ICP	1000
Chromium	ICP	10
Cobalt	ICP	10
Copper	ICP	10
Iron	ICP	100
Lead	GFAA	2
Magnesium	ICP	1000
Manganese	ICP	10
Mercury	Cold Vapor	0.2
Nickel	ICP	20
Potassium	ICP	2000
Selenium	GFAA	2
Silver	ICP	5
Sodium	ICP	1000
Thallium	GFAA	2
Tin	ICP	40
Vanadium	ICP	10
Zinc	ICP	20
Cyanide	Colorimetric	10

Note: The above list may or may not contain compounds that are routinely analyzed at CRL for low level detection limits for drinking water.

See inorganic Routine Analytical Services (RAS) for related CAS #.

ADDENDUM D

**SPECIAL ANALYTICAL SERVICES
DETECTION LIMITS**

High Concentration Samples

TABLE D
SAS HIGH CONCENTRATION
VOLATILES DETECTION LIMITS

PARAMETER	C&S #	DETECTION LIMIT
Benzene	71-43-2	2.5 mg/Kg
Bromodichloromethane	75-27-4	2.5
Bromoform	75-25-2	2.5
Bromomethane	74-83-9	5.0
Carbon tetrachloride	56-23-5	2.5
Chlorobenzene	108-90-7	2.5
Chloroethane	75-00-3	5.0
2-Chloroethylvinylether	110-75-8	5.0
Chloroform	67-66-3	2.5
Chloromethane	74-87-3	5.0
Dibromochloromethane	124-48-1	2.5
1,2-Dichloropropane	78-87-5	2.5
1,2-Dichloroethane	107-06-2	2.5
1,1-Dichloroethene	75-35-4	2.5
1-1-Dichloroethane	75-34-3	2.5
Total-1,2-Dichloroethene	540-59-0	2.5
1,2-Dichloropropane	78-87-5	2.5
cis-1,3-Dichlopropene	10061-01-5	2.5
trans-1,3-Dichlopropene	10061-02-6	2.5
Ethyl benzene	100-41-4	2.5
Methylene chloride	75-09-2	2.5
1,1,2,2-Tetrachloroethane	79-34-5	2.5
Tetrachlorethene	127-18-4	2.5
Toluene	108-88-3	2.5
1,1,1-Trichloroethane	71-55-6	2.5
1,1,2-Trichloroethane	79-00-5	2.5
Trichloroethene	79-01-6	2.5
Vinyl chloride	75-01-4	5.0
Acetone	67-64-1	5.0
Carbon disulfide	75-15-0	2.5
2-Butanone	78-93-3	5.0
Vinyl acetate	108-05-4	5.0
4-Methyl-2-pentanone	108-10-1	5.0
2-Hexanone	591-78-6	5.0
Styrene	100-42-5	2.5
Xylenes	1330-02-7	2.5

* o-xylene and p-xylene are reported as a total.

TABLE D (Cont.)
SAS HIGH CONCENTRATION
SEMIVOLATILES DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Bis(2-chloroethyl)ether	111-44-4	20
Phenol	108-95-2	20 mg/Kg
2-Chlorophenol	95-57-8	20
1,3-Dichlorobenzene	541-73-1	20
1,4-Dichlorobenzene	106-46-7	20
1,2-Dichlorobenzene	95-50-1	20
Benzyl alcohol	100-51-6	20
bis(2-chloroisopropyl)ether	108-60-1	20
2-Methylphenol	95-48-7	20
Hexachloroethane	67-72-1	20
N-Nitrosodipropylamine	621-64-7	20
Nitrobenzene	98-95-3	20
4-Methylphenol	106-44-5	20
Isophorone	78-59-1	20
2-Nitrophenol	88-75-5	20
2,4-Dimethylphenol	105-67-9	20
bis(2-chloroethoxy)methane	111-91-1	20
2,4-Dichlorophenol	120-83-2	20
1,2,4-Trichlorobenzene	120-82-1	20
Naphthalene	91-20-3	20
4-Chloroaniline	106-47-8	20
Hexachlorobutadiene	87-68-3	20
Benzoic acid	65-85-0	100
2-Methylnapthalene	91-57-6	20
4-Chloro-3-methylphenol	59-50-7	20
Hexachlorocyclopentadiene	77-47-4	20
2,4,6-Trichlorophenol	88-06-2	20
2,4,5-Trichlorophenol	95-95-4	100
2-Chloronaphthalene	91-58-7	20
Acenaphthylene	208-96-8	20
Dimethyl phthalate	131-11-3	20
2,6-Dinitrotoluene	606-20-2	20
Acenaphthene	83-32-9	20
2-Nitroaniline	88-74-4	100
3-Nitroaniline	99-09-2	100
Dibenzofuran	132-64-9	20
2,4-Dinitrophenol	51-28-5	100
2,4-Dinitrotoluene	121-14-2	20

TABLE D (Cont.)
SAS HIGH CONCENTRATION
SEMIVOLATILES DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Fluorene	86-73-7	20 mg/kg
4-Nitrophenol	100-02-7	100
4-Chlorophenyl phenyl ether	7005-72-3	20
diethyl phthalate	84-66-2	20
4,6-Dinitro-2-methylphenol	534-52-1	100
1,2-Diphenylhydrazine	122-66-7	
n-Nitroso diphenylamine *	86-30-6	20
Diphenylamine *	122-39-4	
4-Nitroaniline	100-01-6	100
4-Bromophenyl phenyl ether	101-55-3	20
Hexachlorobenzene	118-74-1	20
Pentachlorophenol	87-86-5	100
Phenanthrene	85-01-8	20
Anthracene	120-12-7	20
di-n-Butyl phthalate	84-74-2	20
Fluoranthene	206-44-0	20
Pyrene	129-00-0	20
Butyl benzyl phthalate	85-68-7	20
Chrysene	218-01-9	20
Benzo(a)anthracene	56-55-3	20
bis(2-ethylhexyl)phthalate	117-81-7	20
di-n-octyl phthalate	117-84-0	20
Benzo(b)fluoranthene	205-99-2	20
Benzo(k)fluoranthene	207-08-9	20
Benzo(a)pyrene	50-32-8	20
Indeno(1,2,3-cd)pyrene	193-39-5	20
Dibenzo(a,h)anthracene	53-70-3	20
Benzo(g,h,i)perylene	191-24-2	20
2-Nitroaniline	88-74-4	100
3,3'-Dichlorobenzidine	91-94-1	40

* These two parameters are reported as a total.

() Values in parentheses are estimates.

The actual values are being determined at this time.

Note: Limits are for reagent water.

TABLE D (Cont.)
SAS HIGH CONCENTRATION
PESTICIDE AND PCB DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMIT
Aldrin	309-00-2	20 mg/Kg
alpha BHC	319-84-6	20
beta BHC	319-85-7	20
delta BHC	319-86-8	20
gama BHC (Lindane)	58-89-9	20
Chlordane	57-74-9	20
alpha-Chlordane	5103-71-9	20
gamma-Chlordane	5103-74-2	20
4,4'-DDD	72-54-8	20
4,4'-DDE	72-55-9	20
4,4'-DDT	50-29-3	20
Dieldrin	60-57-1	20
Endosulfan I	959-98-8	20
Endosulfan II	33213-65-9	20
Endosulfan sulfate	1031-07-8	20
Endrin	72-20-8	20
Endrin aldehyde	7421-93-4	20
Endrin ketone	53494-70-5	20
Heptachlor	76-44-8	20
Heptachlor epoxide	1024-57-3	20
Methoxychlor	72-43-5	20
Toxaphene	8001-35-2	50
Monochlorobiphenyl	27323-18-8	100
Dichlorobiphenyl	2051-60-7	100
Trichlorobiphenyl	2051-61-8	100
Pentachlorobiphenyl	25429-29-2	100
Hexachlorobiphenyl	26601-64-9	100
Heptachlorobiphenyl	28655-71-2	100
Octachlorobiphenyl	55722-26-4	200
Nonachlorobiphenyl	53742-07-7	200
Decachlorobiphenyl	2051-24-3	200
Tetrachlorobiphenyl	2051-62-9	100
Aroclor-1016	12674-11-2	10
Aroclor-1221	11104-28-2	10
Aroclor-1232	11141-16-5	10
Aroclor-1242	53469-21-9	10
Aroclor-1248	12672-29-6	10
Aroclor-1254	11097-69-1	10
Aroclor-1260	11096-82-5	10

TABLE D (Cont.)
SAS HIGH CONCENTRATION
INORGANIC DETECTION LIMITS

PARAMETER	CAS #	DETECTION LIMITS
Aluminum	7429-90-5	400 mg/kg
Antimony	7440-36-0	20
Arsenic	7440-38-2	20
Barium	7440-39-3	120
Beryllium	7440-41-7	40
Cadmium	7440-43-9	10
Calcium	7440-70-2	800
Chromium	7440-47-3	30
Cobalt	7440-48-4	200
Copper	7440-50-8	40
Iron	7439-89-6	200
Lead	7439-92-1	100
Lithium		
Magnesium	7439-95-4	800
Manganese	7439-96-5	40
Mercury	7439-97-6	0.3
Molybdenum		40
Nickel	7440-02-0	40
Potassium	7440-09-7	
Selenium	7782-49-1	20
Silicon		800
Silver	7440-22-4	40
Sodium	7440-23-5	4000
Strontium		
Thallium	7440-28-0	400
Titanium		400
Tin		
Vanadium	7440-62-2	200
Yttrium		
Zinc	7440-66-6	40
Cyanide		1.5
Sulfide		2.5
Conductivity		3.0 uhmos/cm

Note: Compounds with detection limits are analyzed by this method.
Compounds without detection limits can be analyzed by a special SAS request.

SC = Specific conductance value

APPENDIX E

WELL LOGS OF THE AREA OF THE SITE

WELL LOG 1
GEOLOGICAL AND WATER SURVEYS WELL RECORD

Completed 4-6-78

10. Property owner BENNETT CONST Well No. _____

Non-responsive

Driller JESSIE BEAMAN License No. 92-599

11. Permit No. 70975 Date 1-31-78

12. Water from SAND & GRAVEL 13. County BOONE

Formation
at depth 61 to 65 ft. Sec. 14

14. Screen: Diam. 4 in. Twp. 44N

Length: 4 ft. Slot 25 Rge. 3E
Elev. _____

15. Casing and Liner Pipe

Diam. (in.)	Kind and Weight	From (Ft.)	To (Ft.)
5	15'00 BLACK	0	61

SHOW
LOCATION IN
SECTION PLAT
Lot#8, Stanley
Estates Subd.
SW SW NW
(permit)

16. Size Hole below casing: 4 in.
17. Static level 30 ft. below casing top which is _____ ft.
above ground level. Pumping level 40 ft. when pumping at 8
gpm for 2 hours. Sub. pump set at 50'

18. FORMATIONS PASSED THROUGH	THICKNESS	DEPTH OF BOTTOM
CLAY	15	0.5
SAND & GRAVEL	33	4.8
CLAY-GRAVEL	5	5.2
SAND & GRAVEL	13	6.5

(CONTINUE ON SEPARATE SHEET IF NECESSARY)

SIGNED Jessie Beaman DATE 6-15-78

IN 14 02/257

BOONE

14-44N-3E

WELL LOG 6
GEOLOGICAL AND WATER SURVEYS WELL RECORD

10. Property owner PHIL ADKINS Well No. _____

Non-responsive

Driller MELVIN MCKINNEY License No. 72-481

11. Permit No. 107245 Date 5-23-83

12. Water from SAND & GRAVEL 13. County BOONE

Formation
at depth 40 to 68 ft. Sec. 13.60

14. Screen: Diam. 5 in. Twp. 44N

Length: 5 ft. Slot 20 Rge. 3E
Elev. _____

15. Casing and Liner Pipe

Diam. (in.)	Kind and Weight	From (Ft.)	To (Ft.)
5	STEEL	0	64

SHOW
LOCATION IN
SECTION PLAT
SWSE 44N

16. Size Hole below casing: 5 in.
17. Static level 35 ft. below casing top which is 1 ft.
above ground level. Pumping level 40 ft. when pumping at 30
gpm for 2 hours.

18. FORMATIONS PASSED THROUGH	THICKNESS	DEPTH OF BOTTOM
TOP SOIL	2	2
SAND & GRAVEL	66	6.8

(CONTINUE ON SEPARATE SHEET IF NECESSARY)

SIGNED Melvin McKinney DATE 7-29-83

13.6 44N 3E

WELL LOG 2

GEOLOGICAL AND WATER SURVEYS WELL RECORD

Boone County Home

Completed 12-22-69

10. Property owner Boone County Home Well No. 1

Address Pol Videre, Ill

Driller J. W. Martin License No. 92-332

11. Permit No. 8646 Date Nov. 3, 1969

12. Water from Sandstone 13. County Boone

at depth _____ to _____ ft.

Sec. Non-responsive

14. Screen: Diam. _____ in.

Twp. _____

Length: _____ ft. Slot _____

Rge. _____

Elev. _____

15. Casing and Liner Pipe

Diam. (In.)	Kind and Weight	From (Ft.)	To (Ft.)
8"	Wt. S.C. T.C. 26	+1 1/2'	287'6"
Cement	grouted 5' to 76'.	driller	

SHOW LOCATION IN SECTION PLAT
500'S Line,
500'W Line,
NE (Permit)

16. Size Hole below casing: 8 in.

17. Static level 30'5" ft. below casing top which is 1 1/2 ft. above ground level. Pumping level 77 ft. when pumping at 330 gpm for 12 hours.

18. FORMATIONS PASSED THROUGH	THICKNESS	DEPTH OF BOTTOM
Fill Gravel	4'	4'
Yellow Clay, Gravel	21'	25'
Gray Clay, Gravel	7	32'
Clay, sand, Gravel	113	145'
Fine sand	95	240'
Cemented Gravel	30	270'
Gray Limestone	40	310'
Glenwood	23'	333'
Sandstone (last 2' quartz Limestone)	187'	520'

(CONTINUE ON SEPARATE SHEET IF NECESSARY)

SIGNED James P. Martin DATE Dec. 30, 1969

COUNTY No. 467

S. S. #56690

Drilling samples sent to Urbana Ill.

BOONE

14-44N-3E

GEOLOGICAL AND WATER SURVEYS WELL RECORD

Completed 11-2-74

10. Property owner Don Clinitz Well No. 136-74

Non-responsive

Driller J. W. Martin License No. 92-146

11. Permit No. 355370 Date Oct 1 - 74

12. Water from drift 13. County Boone

at depth _____ to _____ ft.

14. Screen: Diam. 5 in.

Length: 4 ft. Slot 0.20

Rge. _____

Elev. _____

15. Casing and Liner Pipe

Diam. (In.)	Kind and Weight	From (Ft.)	To (Ft.)
5	5" W.K. Steel	0	82

SHOW LOCATION IN SECTION PLAT
SE SW NW
(permit)

16. Size Hole below casing: _____ in.

17. Static level 32 ft. below casing top which is 1 ft. above ground level. Pumping level 55 ft. when pumping at 20 gpm for 3 hours. Submersible pump set at 80'

18. FORMATIONS PASSED THROUGH	THICKNESS	DEPTH OF BOTTOM
top soil	10	10
clay	15	25
sand & gravel	20	45
sand	30	75
gravel	11	86

(CONTINUE ON SEPARATE SHEET IF NECESSARY)

SIGNED Don Clinitz DATE 11-9-74

COUNTY No. 22632

BOONE

14-44N-3E

14-00000-7X

WELL LOG 7

WELL NO. 9, finished in sand and gravel, was completed in June 1969 to a depth of 120 ft by the Layne-Western Co., Aurora. The well is located on Beloit Road near Hulstedt's corner, approximately 2540 ft S and 200 ft E of the NW corner of Section 23, T44N, R3E. The land surface elevation at the well is approximately 785 ft.

A drillers log of Well No. 9 follows:

Strata	Thickness (ft)	Depth (ft)
Black top soil	4	4
Yellow fine to coarse sand, some gravel	51	55
Gray fine to coarse sand and gravel, boulders	40	95
Brown clay with gravel intermixed	9	104
Brown sticky clay	1	105
Brown fine to medium sand, little gravel	8	113
Gray medium to coarse gravel and coarse sand	7	120
Brown clay and gravel and gray fine sand	2	122

A 48-in. diameter hole was drilled to a depth of 10 ft and finished 36 in. in diameter from 10 to 122 ft. The well is cased with 16-in. galvanized wrought iron pipe from 2 ft above land surface to a depth of 70 ft, 16-in. screen from 70 to 90 ft, 16-in. galvanized wrought iron pipe from 90 to 115 ft, and finished with 16-in. screen from 115 to 120 ft. The screened sections are both No. 90 slot Johnson stainless steel wire wound screens. The annulus is filled with torpedo sand and bentonite from 0 to 32 ft, with cement grout from 32 to 35 ft, and with 50 tons of No. 3 Muscatine gravel from 35 to 122 ft.

A production test was conducted by the driller on June 4, 1969. After 12 hr of pumping at a rate of 1574 gpm, the drawdown was 10.5 ft from a nonpumping water level of 23.0 ft below land surface.

In September 1970, the well reportedly produced 1935 gpm with a drawdown of 13 ft from a nonpumping water level of 22 ft.

The pumping equipment presently installed is a 13-in. Byron Jackson water lubricated line-shaft turbine pump (Serial No. 691C0245) set at 60 ft, rated at 1250 gpm at about 300 ft TDH, and powered by a 125-hp 1770 rpm General Electric motor (Model No. 5K6268XH3A, Serial No. GEJ702117). The well is equipped with 60 ft of airline.

The following mineral analysis made by the Environmental Protection Agency (Lab. No. 02974) is for a water sample from the well collected November 30, 1971.